IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	10/644,791	Confirmation No. 7402
Applicants	:	Anthony A. Gallo et al.	
Filed	:	August 19, 2003	
Title	:	Flame Retardant Molding Compositions Containing Group VIA Metal Oxides	
Group Art Unit	:	1712	
Examiner	:	Christopher M. Keehan	

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Anthony A. Gallo, one of the named inventors of the invention described and claimed in the above-identified patent application, hereby declare and state as follows:

1. I am a graduate of Union College, Schenectady, New York, 1964, with a B.S. degree in Chemistry. I have a Ph.D. in Organic Chemistry, which I received from Tufts University, Medford, MA, in 1969. I have over 30 years of industrial experience in organic chemistry, in the positions noted in Appendix A.

2. I am an author on the publications listed in Appendix B.

3. I am a named inventor on the patents listed in Appendix C. I have an inventor's understanding of the patent system, and I participated in the preparation of the present application. I have read the Office Action and the references cited by the Examiner in the Action, Ogura et al. (US 6,660,811), Gallo et al. (US 5,476,716), von Gentzkow et al. (US 5,760,146) and Heine et al. (US 6,500,546).

4. Under my direction and control, additional experiments were carried out with the sample molding compositions set forth in Table 1 of the present Declaration to specifically address the Examiner's concerns in the previous Office Action. Ten (10) parts of the combination tungsten trioxide and melamine cyanurate were compared to 10 parts tungsten trioxide alone and 10 parts melamine cyanurate alone. These compositions were subjected to the UL94 flammability, gel time and shelf life stability tests as described in the application at pages 11-12. The results of these tests are presented in Table 1 of this Declaration.

5. The data presented in Table 1, in the row designated as Flammability (Set 1 and Set 2) is derived as follows: the flame time after each ignition of a bar is recorded. If the flame time exceeds about 20 seconds, "totally burned" ("tb") is recorded. Each bar is ignited twice, and the total flame time for each bar is added to give the total burn time. Thus, looking at Set 1 data, the 5 bars for Sample A had total burn times of 4, 6, 3, 5 and 7, for a total of 25, whereas the five bars for Sample B were all totally burned. The material of Sample C was not flowable and therefore could not produce parts for testing. The UL94V-O standard requires that the total burn time for each bar not exceed 10 seconds, and that the total for five bars not exceed 50 seconds.

6. As can be seen in Table 1, the composition containing both tungsten trioxide and melamine cyanurate (Sample A) had substantially improved flame retardance as compared to the samples having tungsten trioxide alone (Sample B) or melamine cyanurate alone (Sample C). Sample A more than meets the UL94V-O standard, while the other two samples do not.

7. It is my well-reasoned opinion that the results presented in Table 1 could not have been predicted, based on the teachings of the references cited in the Office Action.

Ogura does not teach the use of a combination of compounds to provide flame retardance, and does not teach the specific combination claimed in the present invention, namely, melamine cyanurate and a Group VIA transition metal oxide such as tungsten oxide. It is my opinion that the present invention is not obvious in view of Ogura alone or Ogura in combination with Gallo, which is merely cited for the teaching of tungsten trioxide. Gallo also does not teach the specific combination of flame retardant compounds used in the present invention. This combination is also not obvious in view of Gallo combined with von Gentzkow or Heine.

TABLE 1

	SAMPLE A	SAMPLE B	SAMPLE C
Silica fillers	69.59	69.59	69.59
Bis-phenol-A type epoxy resin	6.02	6.02	6.02
Solid epoxy cresol novolac resin	7.34	7.34	7.34
Benzophenone dicarboxylic acid dianhydride	4.85	4.85	4.85
Tungsten trioxide	6.00	10.00	0.00
Melamine cyanurate	4.00	0.00	10.00
Black coloring agents	0.40	0.40	0.40
Zinc benzimidizole catalyst	0.10	0.10	0.10
Wax release agents	0.50	0.50	0.50
Silane coupling agent	1.20	1.20	1.20
Total	100.00	100.00	100.00
Gel @177°C/sec	24	26	17
Flow	34.66	38.66	12.66
Flammability, 1/8"			
Set 1	0, 0, 0, 0, 0	0, 0, 0, 0, 0	*
Set 2	4, 6, 3, 5, 7	tb, tb, tb, tb, tb	*

tb = total burn

* = Flow too short where the material not workable to produce parts to test.

8. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so

made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed Name: Anthony A. Gallo

Typed Name: Anthony A. Gallo

Date: 4/11/05

EXPERIENCE:

1997 - Present	Research Scientist, Dexter Electronic Materials Division of the Dexter Corporation, Olean, NY. Formulated "Green" Molding Compounds.
1992 - 1997	Research Associate, Dexter Electronic Materials Division of the Dexter Corporation, Olean, NY. Formulated Semiconductor Molding Powders. Developed "popcorn" resistant molding compounds.
1988 - 1992	Project Leader, Dexter Electronic Materials Division of the Dexter Corporation, Olean, NY. Formulated Semiconductor Molding Powders. Developed a patented additive to protect against intermetallic corrosion.
1980 - 1988	Senior Chemist, Dexter Electronic Materials Division of the Dexter Corporation, Olean, NY. Developed new method for improved Silazanes (two patents granted). Supervised two technicians in their preparation, analysis, and field testing.
1978 - 1980	Senior Chemist, Frekote, Inc., Indianapolis, Indiana. Developed hands-on experience in reacting silicone oils and resins and formulating these materials into finished release products.
1971-1978	Senior Instructor, Department of Biochemistry, School of Medicine, Case Western Reserve University. Performed classroom teaching, prepared scientific articles, and gave presentations at technical meetings.
1969 - 1971	Postdoctoral Fellow, Department of Biochemistry, School of Medicine, Case Western Reserve University. Performed NMR research on Vitamin B_1.

PUBLICATIONS:

(1) "Hydroxyl Proton Coupling in Cyclohexanols, Rotamer Populations of the Hydroxyl Group," R.D. Stolow and A.A. Gallo, *Tetrahedron Letter*, pp. 3331-3336 (1968).

(2) "Destabilization of chair Conformations of Cyclohexanones by t-Butyl-Hydroxyl and t-Butyl-Methoxyl Gauch Interactions," R.D. Stolow, A.A. Gallo and J.L. Marini, *Tetrahedron Letters*, pp. 4655-4658 (1969).

(3) "Magnetic Resonance Study of the $Mn^{2\pm}$ Lysozyme Complex," A.A. Gallo, R.J. Swift, and H.Z. Sable, *Biochem. Biophys. Res. Comm. 43*, 1232-1238 (1971).

(4) "Proton Magnetic Resonance Studies of Complexes of Thiamin Pyrophosphate with Divalent Cations," A.A. Gallo, I.L. Hansne, H.Z. Sable, and T.J. Swift, *J. Biol. Chem. 247*, 5913-5920 (1972).

(5) "Rate Enhancement of Pyruvate Aldolization by Divalent Cations: A Model for Class 2 Aldolases," A.A. Gallo and H.Z. Sable, *Biochem. Biophys. Acta 302*, 443-456 (1973).

(6) "Carbon 13 Nuclear Magnetic Resonance Studies of DL-2-(α-hydroxyethyl) Thiamin and Related Compounds," A.A. Gallo and Y.Z. Sable, *J. Biol. Chem. 251*, 2564-2570 (1976).

(7) "Confirmation of Complexes of Thiamin Pyrophosphate with Divalent Cations as Studies by Nuclear Magnetic Resonance Spectroscopy," A.A. Gallo and H.Z. Sable, *J. Biol. Chem. 250*, 49896 (1975).

(8) "Analogs of Natural Lipids III. Non equivalence of Methyl groups in Methylated Phospholipids," A.A. Gallo, A.J. Hancock, and H.Z. Sable, *J. Lipid Research 18*, 77-80 (1977).

(9) "^{13}C-NMR Relaxation of Trilauroin," A.A. Gallo, *FEBS Letters, 81*, 97-99 (1977).

(10) "Structural and Mechanistic Aspects of Catalysis by Thiamin," A.A. Gallo, J.J. Mieyal and H.Z. Sable, *Biorganic Chemistry*, Vol. 4, Chapter 5, E.E. Van Tamelen ed., Academic Press (1978).

(11) "Artificial Lipids Containing Cyclopentanoid Backbones," H.Z. Sable, S.M. Greenwald, and A.A. Gallo, *Cyclitols and Phosphoinositides*, pp. 3-12, E.E. Van Tamelen ed., Academic Press (1978).

(12) "Conformal Mobility in Thiamin and Related Compound Studies by Carbon-13 Magnetic Resonance," A.A. Gallo, *Annals of the New York Academy of Sciences*, Vol. 378, pp. 78-90 (1982).

(13) "Stress Factors in Molding Compounds," A.A. Gallo, *Proc. ACS Division of Polymeric Materials: Science and Engineering*, Vol. 59, pp. 653-659 (1988).

(14) "Stress Factors in Molding Compounds," A.A. Gallo, *Polymeric Materials for Electronic Packaging and Interconnection*, J. Lupinsky and R. Moore eds. (1989).

(15) "Effect of Mold Compound Components on Moisture-Induced Degradation of Gold-Aluminum Bonds in Epoxy Encapsulated Devices," A.A. Gallo, *International Reliability Physics Symposium*, #90CH2787-0, pp. 244-251 (1990).

(16) "Effect of Mold Compound Components on Electrical Reliability of Gold/Aluminum Bonds in Epoxy Encapsulated Devices subjected to High Temperature/Dry Stress," A.A. Gallo, *Society Plastic Engineers* (1991).

(17) "Effectors of High Temperature Reliability in Epoxy Encapsulated Devices," A.A. Gallo, *International Symposium of the Physical and Failure Analysis of Integrated Circuits* (1993).

(18) "Effectors of High Temperature Reliability in Epoxy Encapsulated Devices," A.A. Gallo, *Electronic Components Technology Conference* (1993).

(19) "Popcorning: A Failure Mechanism in Plastic-Encapsulated Microcircuits," A.A. Gallo and R. Munamarty, *IEEE Transactions on Reliability*, Vol. 44, No. 3 (1995).

(20) "High Solder-Reflow Crack Resistant Molding Compound," A.A. Gallo and T.R. Tubbs, *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 18, No. 3 (1995).

(21) "Accelerated Popcorn Testing of High Solder-Reflow Crack Resistant Molding Compounds," T.R. Tubbs and A.A. Gallo, *Proceeding of the International Acoustic Micro Imaging Symposium* (Jan. 1996).

(22) "High Solder-Reflow Crack Resistant Molding Compound," A.A. Gallo and T.R. Tubbs, *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Vol. 18, No. 3 (1995).

(23) "Moisture Resistant Aluminum Nitride Filler for High Thermal Conductivity Microelectronic Molding Compounds," *Proceedings of the Electronic Components Technology Conference* (May 1996).

PATENTS:

(1) U.S. Patent No. 4,778,907 entitled "Method for Making Organosilazanes", 1-08-1991, Gallo.

(2) U.S. Patent No. 5,104,604 entitled "Flame Retardant Epoxy Molding Compound, Method and Encapsulated Device Method of Encapsulating a Semiconductor Device With a Flame Retardant Epoxy Molding Compound", 4-14-1992, Gallo.

(3) U.S. Patent No. 5,154,976 entitled "Flame Retardant Epoxy Molding Compound, Method and Encapsulated Device", 10-13-1992, Gallo.

(4) U.S. Patent No. 5,338,781 entitled "Flame Retardant Epoxy Molding Compound for Encapsulating a Semiconductor Device", 8-16-1994, Gallo.

(5) U.S. Patent No. 5,413,861 entitled "Semiconductor Device Encapsulated With a Flame Retardant Epoxy Molding Compound", 5-09-1995, Gallo.

(6) U.S. Patent No. 5,420,178 entitled "Flame-Retardant Epoxy Molding Compound," 5-30-1995, Gallo.

(7) U.S. Patent No. 5,476,716 entitled "Flame Retardant Epoxy Molding Compound, Method and Encapsulated Device", 12-19-1995, Gallo.